

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 07-076155

(43)Date of publication of application : 20.03.1995

(51)Int.Cl.

B41J 29/42

B41J 5/30

H04N 1/00

(21)Application number : 05-247503

(71)Applicant : FUJI XEROX CO LTD

(22)Date of filing : 08.09.1993

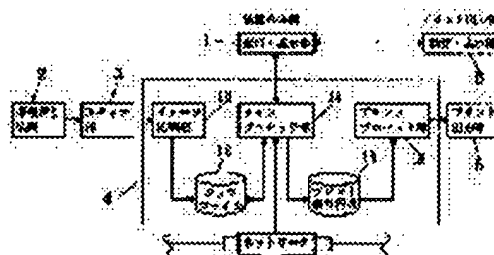
(72)Inventor : NABETA MASAOKI

(54) PRINTER DEVICE

(57)Abstract:

PURPOSE: To supply job processing information such as job completion time and waiting time to a client of printing.

CONSTITUTION: When a job programmed at an operation display section 1 or a job to be sent from a network client is added to a print queue 16, a job processing time and a job completion time pertinent to the printing of the job are calculated at a main processor 14 from a program condition of the job, information on the number of image pages of manuscript, and data compressibility information of each page. When the job is sent from the print queue to a print output section 5, a print processor 18 updates the print completion time of the job in the print queue. From the result of these calculations, a waiting time until print completion of each job is displayed on a display 1, so that information about completion time can be supplied to a client of printing then and there or by return telephone call.



LEGAL STATUS

[Date of request for examination] 15.06.1999

[Date of sending the examiner's decision of 10.07.2001

rejection]

[Kind of final disposal of application other than
the examiner's decision of rejection or
application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's
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[Date of requesting appeal against examiner's
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[Date of extinction of right]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the printer equipment which once held the image data of the print job sent from network clients read in the manuscript, such as an image data and a workstation, was applied to the printer equipment which performs an output print as soon as the printed output section was vacant, especially was equipped with the display function of job termination presumption time amount.

[0002]

[Description of the Prior Art] In the printer equipment in image processing systems, such as a copying machine, a workstation, or the system that combined them, as processing information about a job, it was what can know only the processing time of the job sent to the printed output section from a print queue, i.e., the job which is just going to carry out the printed output after this, in the phase which programs a job, or the phase where a client sends a job to printer equipment as indicated by JP,3-105849,U and JP,3-133270,A, for example. Moreover, there were some which display the amount of communication link reservation of facsimile apparatus (the number of the communication link destinations or the manuscript total number of sheets) as indicated by JP,3-155275,A. With such printer equipment, it was difficult at the time of a print request to predict the latency time and result time of day, and depended on presumption of a full-time operator.

[0003] Moreover, printer equipment has the factor which worsens work environments, such as leakage of ozone generating, the heat release by ** fixing assembly, and the particle toner by ** development counter, and generating of the paper powder by ** form-feed equipment, and office environment with the noise of ** equipment, ** electric discharge machine, and an electrification machine. Among these, ** - ** are generating only in the printed output section, and the most also generates ** and ** in the printed output section. In the present condition, although it is taking the measures of each above-mentioned factor and the improvement of an environment is achieved, sufficient environment is not made in those cures.

[0004]

[Problem(s) to be Solved by the Invention] By the way, since it was installed in the location where conventional printer equipment has same printed output section and body section of equipment, the printed output section became a generation source and work environment or office environment had been affected. Moreover, for the display information on the conventional job processing, it is the spot which requested the print or cannot know by telephone that there is how much the latency time or about what time it will be finished to an inquiry. Moreover, when used as a network printer, the job sent to printer equipment by client sides, such as a workstation, cannot check about what time it is finished. Thus, since a client was not able to know take [an output print] about what time it should go to the place of a printer, it is easy to produce the fault that a print required for predetermined time of day is not obtained. Furthermore, an operator is requested, and if actuation in the case of requiring urgency, such as having the print ranking of the applicable job of a print queue raised to a required place, is performed,

since the job after the job concerned will be delayed uniformly, there are also troubles, like it also happens to other clients to make trouble. The purpose of this invention is offering the printer equipment which can tell job end time and the job latency time to a print client. Moreover, other purposes of this invention are offering the printer equipment which has improved the environment of a location an operator's usually performing printer output actuation.

[0005]

[Means for Solving the Problem] In order to make the above-mentioned purpose attain, this invention indicated by claim 1 In the printer equipment which performs a printed output as soon as it once stores in a print queue the image data of the print job which was read from the scanner or has been sent through a network and the printed output section is vacant The 1st operation means which calculates the print processing time and the print end time of a job of each job by the program conditions and manuscript image pagination of each job, When a job is sent to the printed output section from a print queue, it is in the configuration possessing the 2nd operation means which updates the print end time of the job within said print queue, and a print latency-time display means to display the latency time to print termination of each job. Moreover, other invention is characterized by having one configuration of the degrees. That is, it has the system clock which measures (1) passage of time, and is in the configuration which subtracts the latency time to print termination and was made to update the display with the passage of time.

(2) Compress data at the time of the temporary storage of an image, and be in the configuration which makes the data compression rate one parameter of calculation of job-processing time amount.

(3) In the case of a network job, transform-processing time amount to the print format for a printed output is presumed at the time of conversion to the middle format from a Page Description Language (PDL), and it is in the configuration made into a part of job-processing time amount.

(4) Make an actuation display, a manuscript feed gear, and the scanner section become independent of the printed output section physically, and be in the configuration connected through the telecommunication cable.

(5) Be in the configuration which also overlapped the printed output section side in the part, and gave the function of an actuation display.

[0006]

[Function] According to invention according to claim 1, with the 1st operation means, if a job is added, the job-processing time amount concerning the print of the job and job end time will be calculated from the program conditions of the job concerned, manuscript image pagination information, and the data compression rate information on each page. If a job is sent to the printed output section from a print queue, the 2nd operation means will update the print end time of the job within a print queue. The latency time from the count result by these [1st] and the operation means of 2 to print termination of each job is displayed. Therefore, since the processing termination presumption time amount of each job which is standing by to the print queue is displayed on the print latency-time display means, it is the spot or can tell by telephone about what time it is finished to a print client by clinch communication. While being able to aim at an improvement of work environment/office environment by installing the printed output section in the location which became independent of the control unit of the usual printed output according to invention according to claim 5, even if it installs in the location which left the printed output section by the display of the aforementioned job termination latency time, decline in working efficiency can be suppressed to the minimum.

[0007]

[Example] Below, the example of this invention is explained, referring to a drawing. Drawing 1 shows an example of the system configuration of the printer equipment of this invention. Printer equipment installed the body side actuation display 1 of equipment, the manuscript feed gear 2, a scanner 3, and the machine-control section 4 in the workroom, and equips with the printed output section 5 and the printed output side actuation display 6 the tooth space divided by another room or a screen adjoined and formed in this workroom. The body side actuation display 1 of equipment is connected to the machine-control section 4 through a telecommunication cable 7, and the printer output section 5 is connected to the

machine-control section 4 through the telecommunication cable 8. Usually, an activity is done only by accessing only the body side actuation display 1 of equipment, and the manuscript feed gear 2 in a workroom, and an operator accesses the printed output section 5, only when exchanging or supplying the form of the time of the discharge tray of the printed output section 5 filling, and a medium tray. [0008] Moreover, the control units 6-2 of the need minimum, such as a start button for resumption of a print after the display 6-1 for the procedure directions to an operator and processing, are formed in the printed output section 5. Thus, while being able to cope with form plugging by constituting, these displays/control units are used also at the time of maintenance of the equipment by the serviceman, check, and trouble processing.

[0009] As a description of the system configuration of this example, by installing the printed output section 5 another room and in the inner part of a screen Ozone generating by **/electrification which takes place only by the printed output section 5, Most of heat release by *****, and particle most of [leakage or] by the development counter happen in the printed output section 5. Even if it installs in the location which left the printed output section 5 by the display of the below-mentioned job termination latency time both which can aim at an improvement of work environments, such as noise of an equipment drive, and generating of the paper powder by form-feed equipment, and office environment, decline in working efficiency can be suppressed to the minimum.

[0010] Next, the control system of printer equipment is explained. Drawing 2 shows the hardware configuration of the control system of the printer equipment of this invention. Drawing 3 shows the configuration of the main processor section, the image-processing section, and the print processor section. The actuation display 1 is equipped with display means 1-2 to display the waiting information for a print on the kept job, such as CRT and LCD, for information required in order to perform the actuation means 1-1 and printer ability, such as a key switch for an operator to input job conditions and a touch switch. According to the recording mode based on the inputted job conditions, the manuscript feed gear 2 conveys one manuscript at a time on platen glass from a manuscript bundle, and discharges it after manuscript image read. An optical reader will operate and the scanner section 3 will read a manuscript image, if the manuscript reading location on platen glass is covered with a manuscript. The image-processing section 10 performs image processing of compressing the read image data.

[0011] A job file 12 stores temporarily the image data after image processing sent from the image-processing section 10 (the number of image datas is included) together with the contents of the job program to the job concerned sent from the main processor section 14 (job ticket), i.e., printed output information. The structure of this job file consists of an image data and a job ticket. Here, in addition to the contents of a program of the conventional copying machine for performing after treatment, such as print number of sheets, one side/both sides, ****, and ****, with the contents of the job program, various setup, such as merge (annotation), rotation, and processing (it saves at the job file after after [a print] job deletion / print at a job file, without saving/printing) of a job, is included.

[0012] The main processor section 14 consists of network control 26 which controls the image data which transmits to a disk the data stored in the PDL processing section 20 which performs format conversion (middle format) of a Page Description Language, and RAM in an off process, and is sent from external devices, such as image recording equipment tied by I/O interface 24 for exchanging the print queue / disk control section 22 and the indicative data to store, and input data with the actuation displays 1 or 6, and the communication line (LAN).

[0013] This main processor section 14 programs whether in what kind of sequence printed output processing of the job processed by the image-processing section 10 by the input from the actuation displays 1 or 6 or the job sent by LAN carries out, and performs required image actuation according to this programming, and the waiting information for a print both manages from the received job which stores temporarily in the print queue (it is described as a print queue below) 16 which consists of hard disks, and a job [finishing / processing].

[0014] The print processor section 18 consists of the printed output control 18-1 which controls a print processor and printed output processing. A print processor stores a print job temporarily to a print queue, and displays the message of the purport which has the print job concerned in a print waiting state

on a display 1-2. Moreover, a tray required for a printed output is checked for every I/O of a print job, and the message indicator of the tray information over the print job in a print queue 16 is carried out to a display. If print termination information is received from the printed output control 18-1, this print processor will take out the image data of the following print job from a print queue 16, will perform expanding processing of an image data, and it will carry out a printed output to the printed output control 18-1 from delivery and the printed output section 5.

[0015] Drawing 4 shows the example of a display of a print queue. Drawing 4 (a) is a display just before Job A is sent to the printed output section, and drawing 4 (b) is a display immediately after sending Job A to the printed output section. A print queue is displayed by the queuing time which tells the reception day and time received of a job name and a job, the processing time of a job, and the latency time of a job. For example, as for the time amount which reception and processing of this job A take at 10:00 on June 3, 1992, Job A takes 8 minutes, and it is indicating that it is waiting about for 9 minutes. And if Job A is sent to the printed output section, it will change to the display of drawing 4 (b). Since it takes 8 minutes to process the front job A in this print queue, the subsequent jobs B and C and the latency time of -- are again looked over based on the processing time of this job A. In reexamination of the latency time immediately after sending to the printed output section of Job A in this example, Job C is made for Job B and a display substitute of the future latency time is made for Job D as 35 minutes for 10 minutes for 10 minutes.

[0016] Next, actuation of the above-mentioned system is explained. If a job is programmed and a start button is pushed from an actuation display, the manuscript set in the automatic manuscript feed gear will be sent on a platen one by one, and reading of a manuscript image will be performed by the scanner. The read manuscript image is kept by the job file with the contents and the read image pagination of a job program, after processing of a data compression etc. is performed by the image-processing section. Furthermore, it is sent to the main processor section, and required (programmed) image actuation is performed by the image control unit. Here, the treatment of a job is sent and saved at a job file, when "saving at the job file after a print" and "saving at a job file, without printing" are chosen. moreover -- when "deleting after a print" and "saving after a print at a job file" are chosen, while being stored temporarily by the waiting print queue for a print -- a display -- a print -- an waiting thing is displayed. When saving after a print, a job is sent to the job file and print queue which consist of hard disks 15.

[0017] Here, it is compared with the data of the class of detail paper held in the current printed output section similarly memorized by RAM, while the data of the class of detail paper outputted among the contents of the job program are sent to the main processor section and stored temporarily at RAM. Since these data must be held also when the power source of equipment is turned off, at the time of power-source OFF, data are transmitted on a disk in an off-process, and transfer storing of the data is again carried out from a disk into an on-process at RAM at the time of power-source ON.

[0018] The print processor section 18 stores a print job temporarily to a print queue 16, and displays the message of the purport which has the print job concerned in a print waiting state on a display. Moreover, a tray required for a printed output is checked for every I/O of a print job, and the message indicator of the tray information over the print job in a print queue 16 is carried out to a display. If print termination information is received from printed output control, this print processor will take out the image data of the following print job from a print queue 16, will perform expanding processing of an image data, and it will carry out a printed output to printed output control from delivery and the printed output section.

[0019] Processing of the termination latency time of the job stored temporarily by the job file 12 is explained. Drawing 5 is a flow chart which shows the flow of job termination latency-time processing when there is a job addition to a print queue. The queue control section 22 will calculate the job time amount (t) which starts the job time amount count routine shown in drawing 7, and the print of the job concerned takes, if an instruction of the job addition to a print queue is sent using the parameter of a job program, the information on the read image pagination, and the data compression rate information on each page (S100) (S101). That is, if a job time amount count routine starts, an extract and analyses of a programme parameter, such as existence of assignment of print end time and image actuation information, will be performed (S120), and an extract and analyses of image information, such as

compression and format conversion information, will be performed (S121). And print pretreatment time amount (1), such as the processing time in the print processor section, is calculated (S122). Then, the print time amount (2) in the printed output section is calculated (S123). Furthermore, print after-treatment time amount (3), such as **** in the printed output section and simple bookbinding, is calculated (S124). Job time amount ($t=(1)+(2)+(3)$) is calculated from these count results (S125). The next processing is performed based on this result.

[0020] It judges whether there is any print end time assignment as a programme parameter (S102), and in a certain case, the job location optimization routine shown in drawing 8 is started, and it optimizes to it based on the processing ranking (job location) of the job in a print queue. That is, the location of the very back in the print queue which satisfies the job end time demanded is determined (S103).

[0021] If a job location optimization routine starts and job time amount of the job concerned will be first set to "t", the job concerned will be added to the location of time amount $T_{n-1}+t$ within the assignment time amount of a job (S130). Subsequently, the latency time of the job in a print queue is calculated (S131). Consequently, it judges whether there is any job which exceeds the appointed time of day (S132). This processing is ended when there is no job to exceed. When there is a job exceeded on the other hand, it judges whether a job without time-of-day assignment is between an applicable job and the job which exceeds the appointed time of day (S133). When there is a job without time-of-day assignment, a job and sequence without the nearest time-of-day assignment are changed (S134), a return is carried out to step 131, and it processes again. Moreover, when there is no job without time-of-day assignment, conversion (those with excess) is performed for the sequence of the job of the appointed time-of-day over, and an applicable job (S135). The next processing is performed based on this processing result.

[0022] It judges whether all the optimized jobs satisfy job termination assignment time amount (S104), and a warning message is displayed when the job with which are not satisfied of the job end time specified by the job concerned added comes out (106). When there is no end time assignment, a job is added to the tail end of a print queue (S105). After processing of steps 104 or 105, the display of the job time amount (t_n) (job-processing time amount shown in drawing 4) of the job concerned and the job latency time ($T_n=T_{n-1}+t_n$) is performed (S107).

[0023] Next, when there is no job addition, display processing of the job latency time is performed by the procedure shown in drawing 6 to a print queue. That is, in step 100, decision of that there is no job addition instruction to a print queue judges the existence of the job sending instruction from a print queue (108). If a job is sent to the printed output section according to a job sending instruction, the display of the head job in a print queue will be deleted (S109), and the latency-time display of the job in a print queue will be updated (S110). This update is calculated by $T_n=T_{n-1}+t_n$ as $n=1-N$. In step 108, when there is no job sending instruction from a print queue, it judges whether it is at the stage (update stage) to update the contents which predetermined time amount passes and are displayed on the display (S111), and when the stage has not come, a return is carried out to step 100. When it is at an update stage, the latency-time display of the job in a print queue is updated (S112). This update is calculated by $T_n=T_{n-1}$ as $n=1-N$.

[0024] The job currently kept by above processing ***** and the job file is sent to the optimal location of the determined print queue, and while being stored temporarily, the job time amount and the job latency time which were calculated by the print queue control section are displayed on a display. In the print queue control section, further, the latency time of all the jobs in the print queue 16 memorized by RAM is subtracted, and the display of a display is updated to whenever [the] by the time amount progress from the output print initiation by the printed output section, for example, per minute.

[0025] At the time of printed output termination of one job, the job of the head of a print queue is sent to the print processor section, and the printed output of a job is directed. The job latency time of each job is corrected to a print queue based on the data of the job time amount of an waiting job at the time, and update of a display is performed. Even if an error is in the job-processing time amount calculated by the print queue control section and the actually taken job-processing time amount, it is at the termination time of an applicable job, and the job latency time of a subsequent job is corrected by this.

[0026] Next, interruption processing of a job is explained, referring to drawing 9. When it judges whether the interruption job occurred (S140) and there is an interruption job, it considers that the job concerned is the 1st place of priority, the job time amount of the job concerned is calculated (S141), and a job is added and displayed at the head of a print queue (S142). And the latency time of the job in a print queue is calculated (S143). It judges whether there is any job which exceeds the appointed time of day from this count result (S144), and when there is no job which exceeds the appointed time of day, the latency time of the job in a print queue is indicated by correction (RIBAISU) (S146). When there is a job which exceeds the appointed time of day, it judges whether a job without time-of-day assignment is before the job (S145). When there is a job without time-of-day assignment, a job and sequence without the nearest time-of-day assignment are changed, and a return is carried out to step 140 (S147).

[0027] When there is no job which, on the other hand, does not have time-of-day assignment, while indicating the latency time of the job in a print queue by RIBAISU (S148), the warning message of the job which exceeds the appointed time of day is displayed (S149), and a return is carried out to step 140. When according to processing of the above-mentioned example the existence of the assignment time amount over of a job with the print end time assignment by interruption generating is checked and there is a job of assignment time amount over, the sequence of the job in a print queue is optimized and evasion is aimed at. In the case of evasion impossible, a warning message is displayed.

[0028] On the other hand, after format conversion of a Page Description Language is performed in the PDL processing section in the case of the job sent through the network from a client, it is sent to the optimal location of a print queue in the print queue control section. Here, this processing presumption time amount is used for count of job-processing time amount instead of the data compression rate in the case of being at the scanning job time to which analysis of the contents of a job is carried out, and forecasting calculation of the processing time in the print processor section at the time of an output, i.e., the conversion time to the print format from a middle format, is carried out at the time of format conversion. And such job termination latency-time information is fed back to a client side according to a status demand from a client.

[0029]

[Effect of the Invention] Since the processing termination presumption time amount of each job which is standing by to the print queue is displayed according to this invention an above-mentioned passage and an output print termination predetermined time will be displayed if manuscript read with the program and scanner of a job is ended when used, for example as a copying machine in a copy pin center, large, it is the spot or can tell by telephone about what time it is finished to a copy client by clinch communication. Moreover, when used as a network printer, the job sent to printer equipment by client sides, such as a workstation, can know [which is finished about what time / or or] take [an output print] about what time since a check can be carried out, it should go to the place of a printer. Furthermore, in the job termination predetermined time displayed when requiring urgency, when too late, the operator of a printer can be requested and actuation of having the print ranking of the applicable job of a print queue raised to a required place can also be performed.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing an example of the system configuration of the printer equipment of this invention.

[Drawing 2] It is the block diagram showing the hardware configuration of the control system of the printer equipment of this invention.

[Drawing 3] It is the block diagram showing the hardware configuration of the main processor section, the image-processing section, and the print processor section.

[Drawing 4] The example of a display of a print queue is shown and drawing 4 (a) is drawing for a display just before Job A is sent to the printed output section, and drawing 4 (b) to explain a display immediately after sending Job A to the printed output section.

[Drawing 5] It is the flow chart which shows the flow of job termination latency-time processing when there is a job addition to a print queue.

[Drawing 6] It is the flow chart which shows the flow of the display process of the job latency time in case there is no job addition to a print queue.

[Drawing 7] It is the flow chart of a job time amount count routine.

[Drawing 8] It is the flow chart of a job location optimization routine.

[Drawing 9] It is the flow chart of a job interruption routine.

[Description of Notations]

1 [-- The machine-control section, 5 / -- The printed output section, 6 / -- A printed output side actuation display, 10 / -- The image-processing section, 12 / -- A job file, 14 / -- The main processor section, 16 / -- A print queue, 18 / -- Print processor section] -- The body side actuation display of equipment, 2 -- A manuscript feed gear, 3 -- The scanner section, 4

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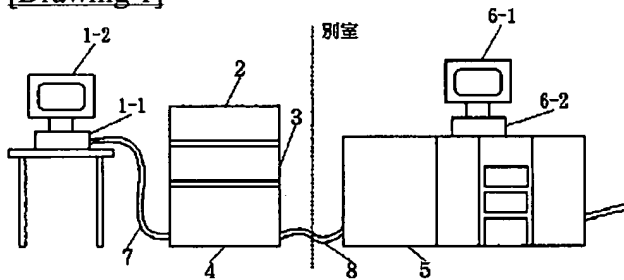
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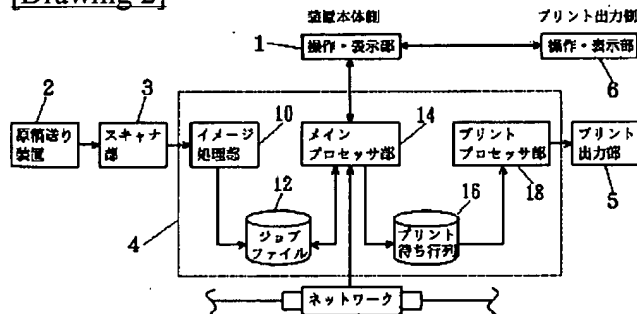
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DRAWINGS

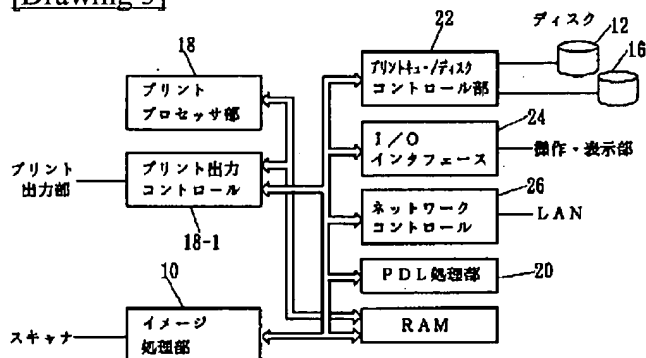
[Drawing 1]



[Drawing 2]



[Drawing 3]



[Drawing 4]

プリント待ち行列

ジョブ名	キューイング 日 時	ジョブ処理 時 間	待ち時間
ジョブ A	92/6/3 10:00:00	8 分	9 分
ジョブ B	92/6/3 10:03:50	2 分	1 1 分
ジョブ C	92/6/3 10:05:15	0 分	1 1 分
ジョブ D	92/6/3 10:11:20	2 5 分	3 6 分
ジョブ E	92/6/3 10:18:10	4 2 分	1 時間 1 8 分

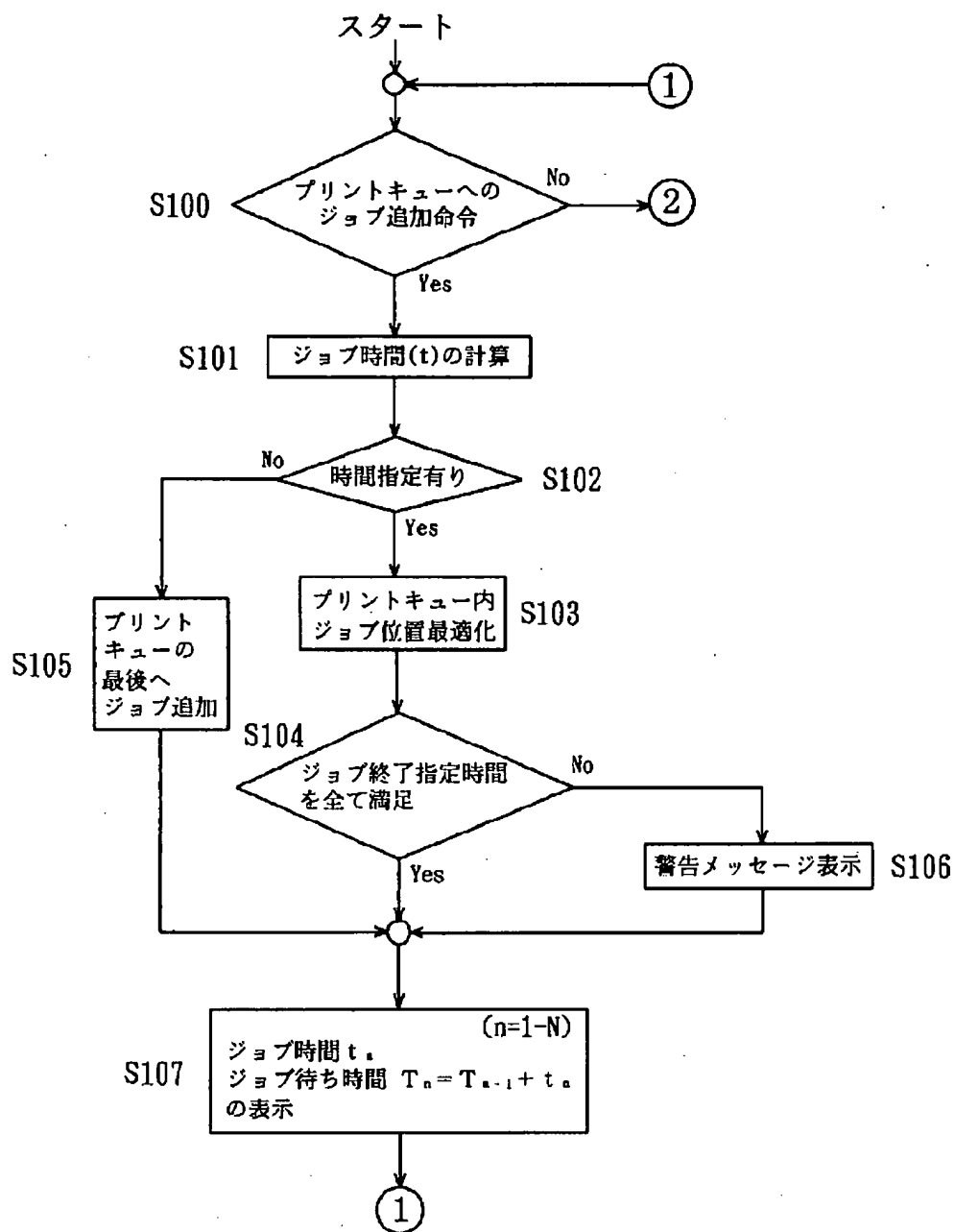
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プリント待ち行列

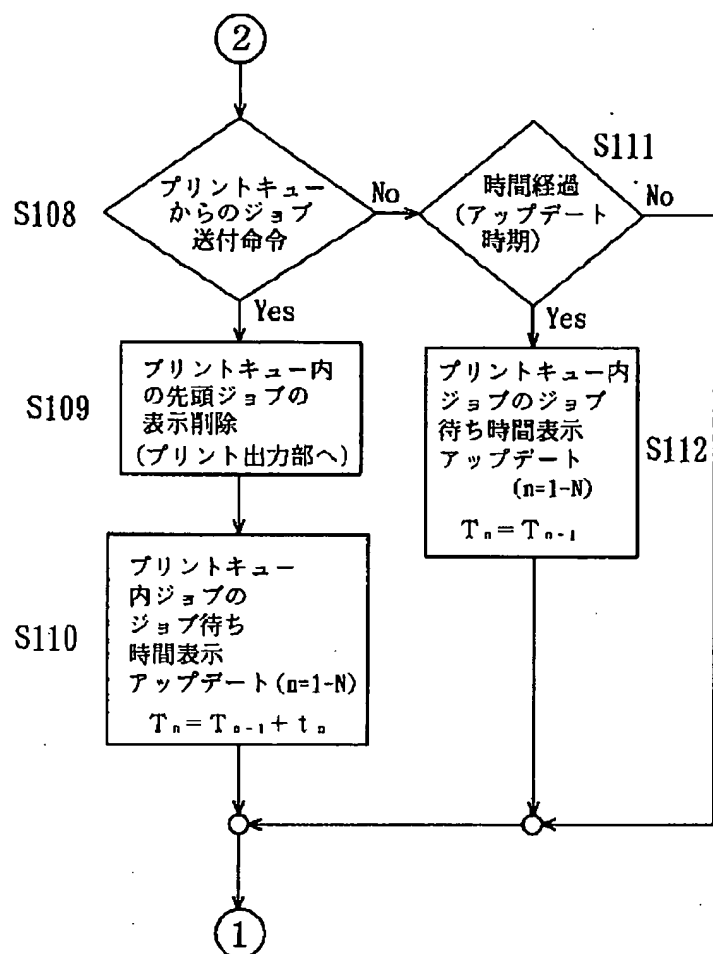
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ジョブ D	92/6/3 10:11:20	2 5 分	3 5 分
ジョブ E	92/6/3 10:18:10	4 2 分	1 時間 1 7 分

(b)

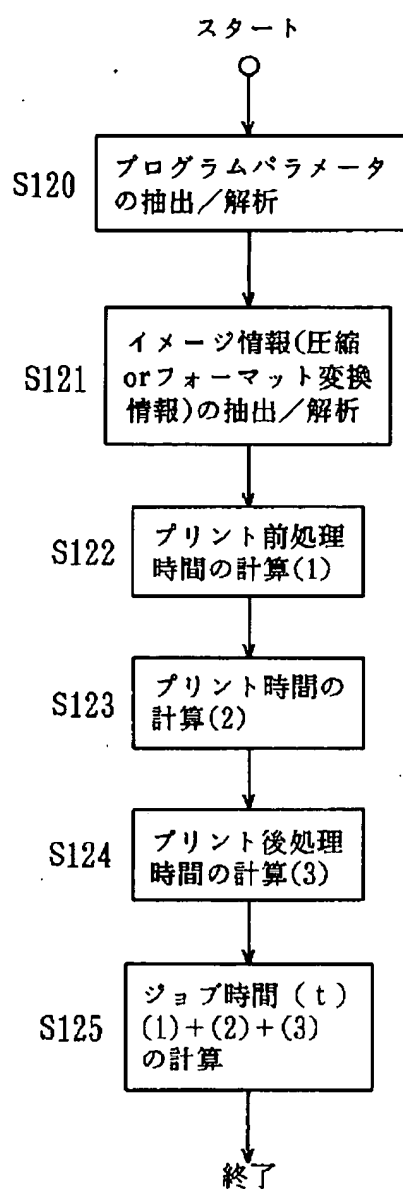
[Drawing 5]



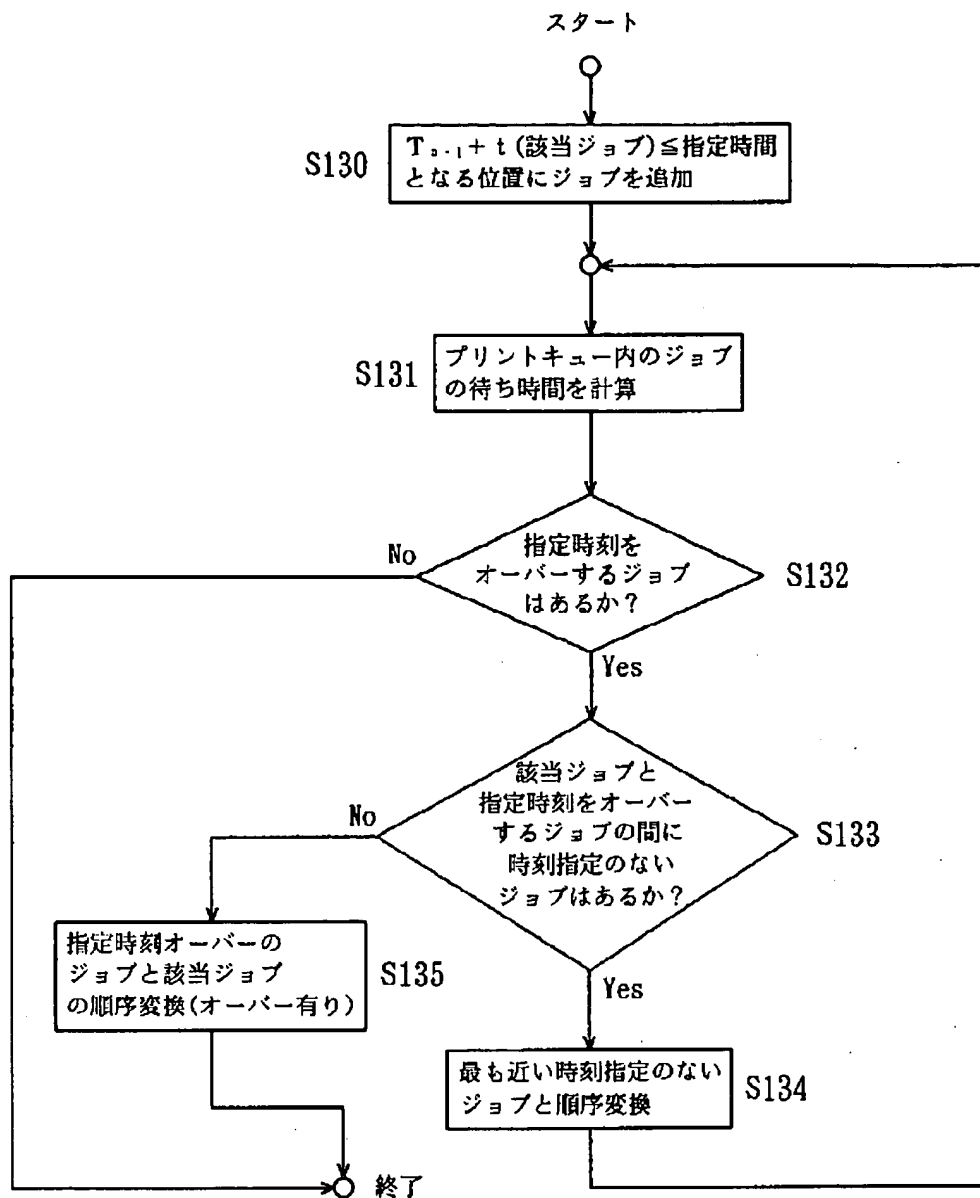
[Drawing 6]



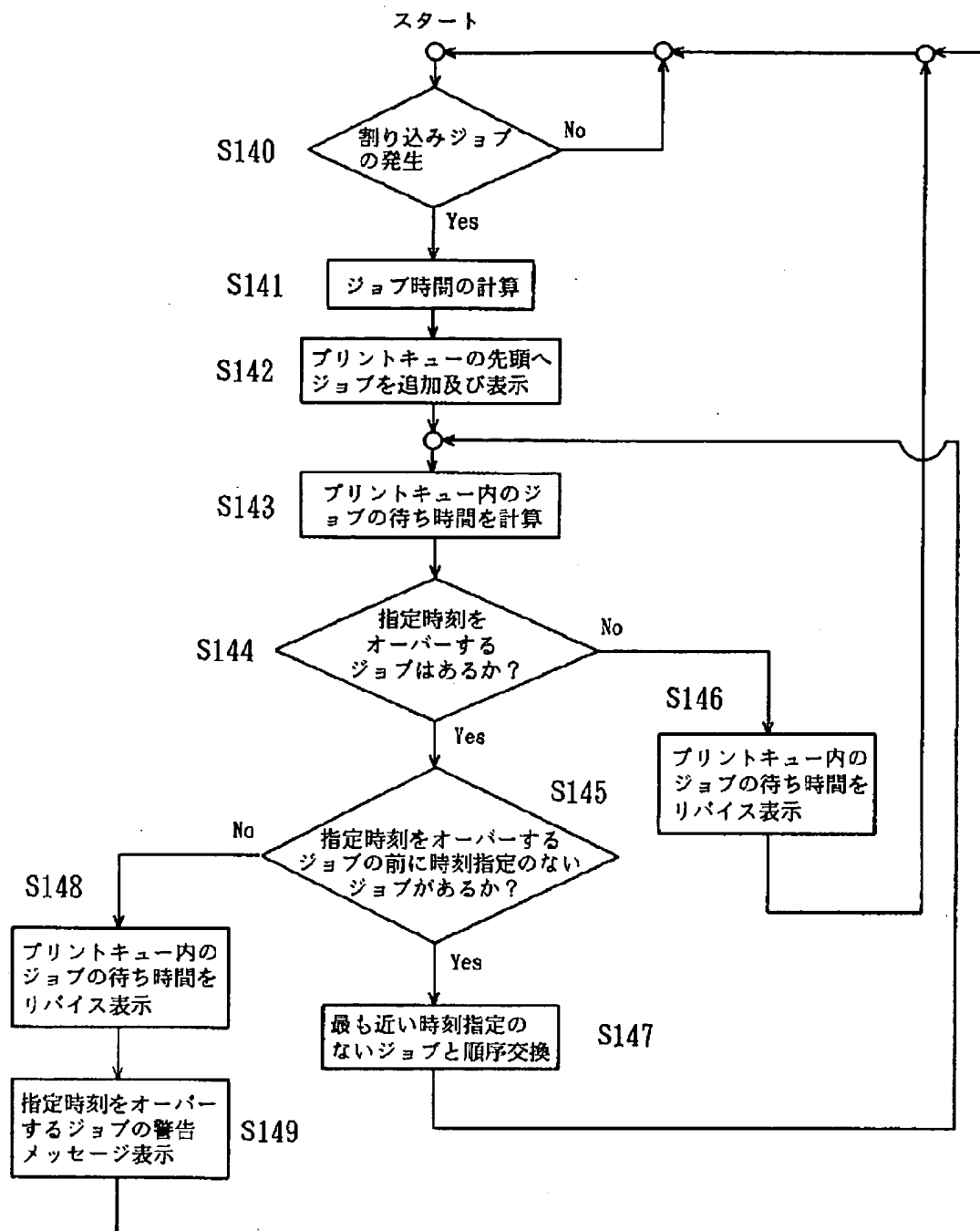
[Drawing 7]



[Drawing 8]



[Drawing 9]



[Translation done.]